



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,000	03/23/2004	Ki-Chul Kim	5649-1266	2826
20792	7590	06/29/2005		EXAMINER
MYERS BIGEL SIBLEY & SAJOVEC PO BOX 37428 RALEIGH, NC 27627			NGUYEN, THINH T	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/807,000	KIM ET AL.
	Examiner	Art Unit
	Thinh T. Nguyen	2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 15 June 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-22 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 23 March 2004 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED OFFICE ACTION**

1. Applicant election of claims 1-22 for prosecution without traverse in the communication with the Office on 6/10/2005 is acknowledged.

**Specification**

2. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant cooperation is requested in correcting any errors of which the applicant may become aware in the specification.

**Claim Rejections - 35 USC § 102**

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(a/b/e) that form the basis for the rejections under this section made in this office action.

A person shall be entitled to a patent unless --

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 2818

4. Claim 1,2,7,10,12, 13,18,21 are rejected under 35 U.S.C. 102(e) as being anticipated by Lou (U.S. Patent No. 6,468,858).

**REGARDING CLAIM 1**

Lou ( fig 9 ,column 4 line 21-22 ) discloses an integrated circuit comprising: a microelectronic substrate; a dielectric layer on the substrate; a conductive contact plug ( fig 9 reference 9 ) extending through an opening in the dielectric layer to contact the substrate and including a widened pad ( fig 9 reference 60) portion extending onto the dielectric layer adjacent the opening; an ohmic pattern on the pad portion of the plug; ( fig 9 reference 10b ) this layer is made of tungsten, a barrier pattern on the ohmic pattern ( fig 9 reference 11b) made of ruthenium ; a concave first capacitor electrode disposed ( fig 9 layer 20b) on the barrier pattern and defining a cavity opening away from the substrate; a capacitor dielectric layer ( fig 9 layer 22) conforming to a surface of the first capacitor electrode; and a second capacitor electrode ( fig 9 layer 23) disposed on the capacitor dielectric layer opposite the first capacitor electrode.

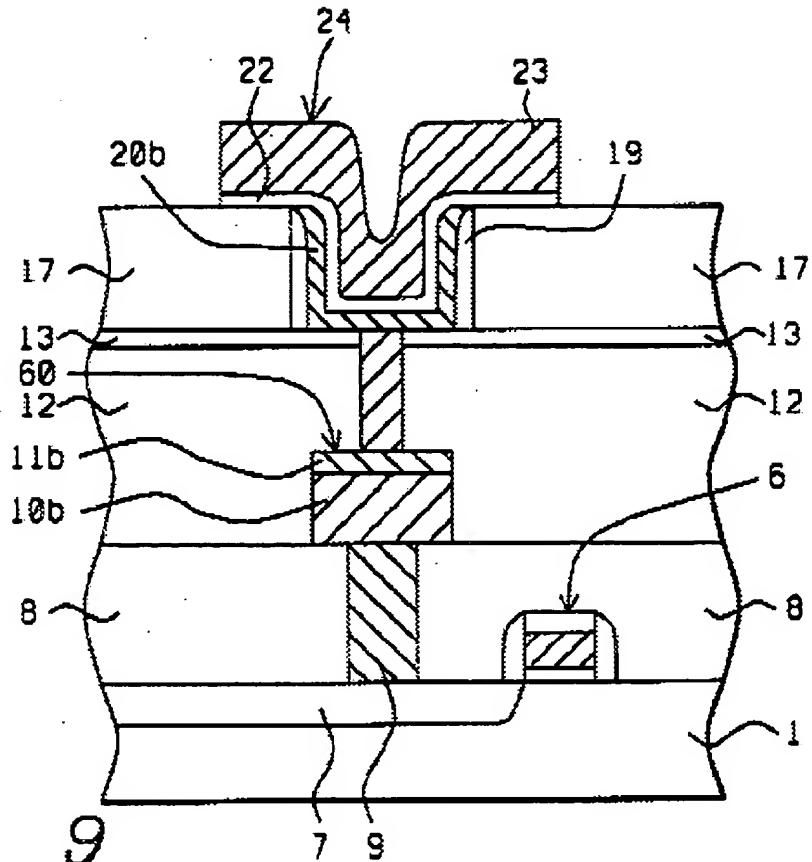


FIG. 9

REGARDING CLAIM 13

Lou ( fig 9 ,column 4 line 21-22 ) discloses an integrated circuit device comprising: a microelectronic substrate; a dielectric layer on the substrate; a conductive contact plug extending ( fig 9 reference 9) through an opening in the dielectric layer to contact the substrate and including a widened pad portion( fig 9 reference 60 ) extending onto the dielectric layer adjacent the opening; stacked ohmic ( fig 9 reference 10b) and barrier patterns ( fig 9 reference 11b) disposed on the pad portion of the plug and having sidewalls substantially coplanar with a sidewall of the pad portion; a first capacitor electrode ( fig 9 layer 20b) disposed on the barrier pattern; a capacitor dielectric layer ( fig 9 layer 22) on the first capacitor electrode; and a

Art Unit: 2818

second capacitor electrode ( fig 9 layer 23) on the capacitor dielectric layer opposite the first capacitor electrode.

**REGARDING CLAIM 2**

Lou discloses an integrated circuit wherein sidewalls of the ohmic pattern, the barrier pattern and the pad portion of the contact plug are substantially coplanar.

**REGARDING CLAIM 12**

Lou discloses ( in fig 9) support layer 12.

**REGARDING CLAIM 7,18**

Lou discloses an integrated circuit wherein the contact plug is made of polysilicon

**REGARDING CLAIM 10,21**

Lou discloses (the abstract) an integrated circuit having Metal-Oxide-Metal structure wherein the metal is Platinum.

**Claim Rejections - 35 USC § 103**

6. The following is a quotation of U.S.C. 103(a) which form the basis for all obviousness rejections set forth in this office action:

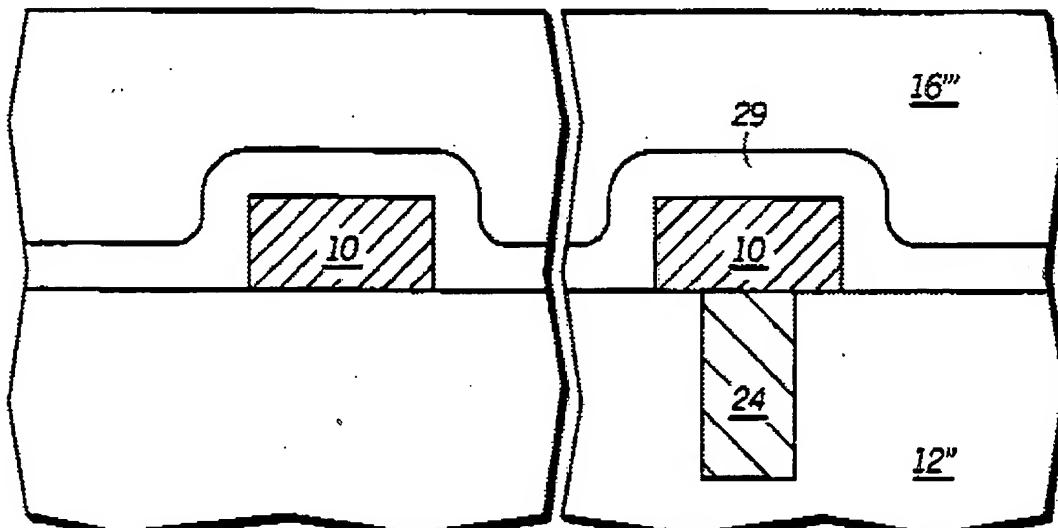
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2818

7. Claims 3-6,8-9,14-17,19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lou (U.S. patent 6,468,858) in view of further remark.

**REGARDING CLAIM 3-6,14-17**

Lou discloses all the inventions of claims 3-6,14-17 except for the use of a conformal etch stop layer; this feature, however, is considered obvious since it is old and well known in the art (as shown by the disclosure by Woo et al. US patent 5,451,543 claim 4 and fig 9 conformal etch stop layer 29) a person skilled in the art at the time the invention was made would have been capable from using the teachings by Lou and his ordinary design skill and come up with the invention of claims 3-6 without any special instructions.



***FIG.9***

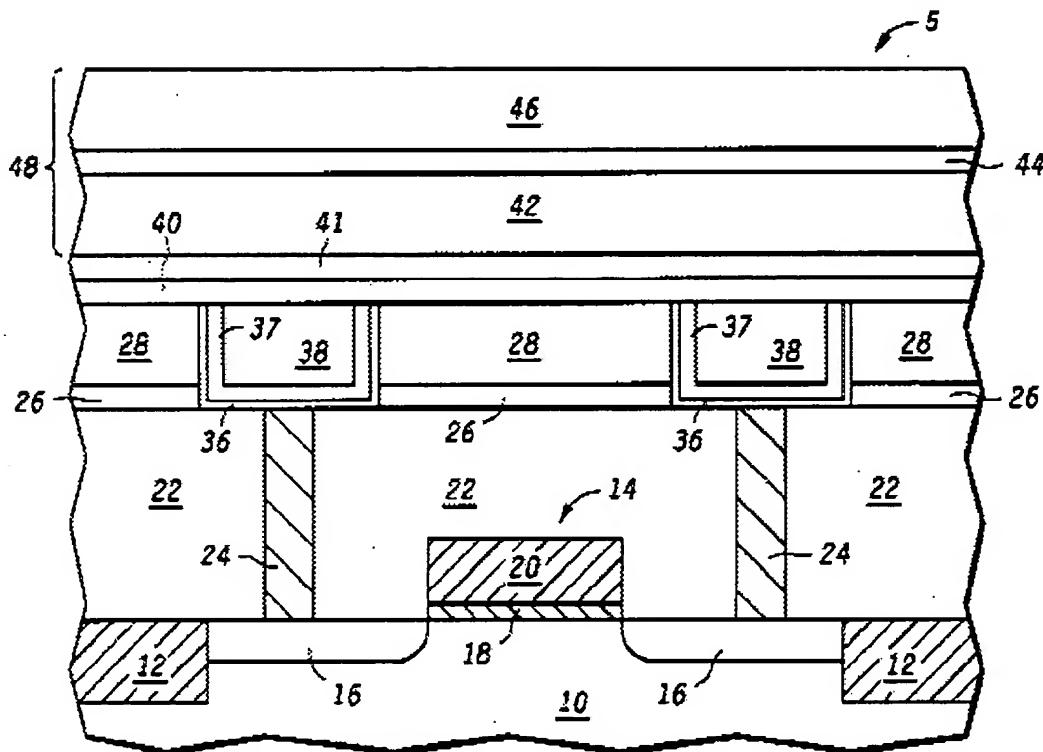
**REGARDING CLAIM 8,19**

Lou discloses all the inventions except for the use of Titanium silicide; this feature, however is considered obvious since the use of titanium nitride as ohmic contact layer is old and

Art Unit: 2818

well known in the art as shown in the disclosure at column 2 line 2 by Islam et al (US patent 6,174,810).

The rationale why claims 8,19 are obvious over Lou has been discussed in the rejection of claims 3-6,14-17.



**FIG. 4**

#### REGARDING CLAIM 9,20

Lou discloses all the inventions except for the use of Titanium nitride, Tantalum nitride etc as barrier layer; this feature, however, is considered obvious since the use of titanium nitride or tantalum nitride as barrier layer are old and well known in the art as shown in the disclosure by Islam et al. (US patent 6,174,810), fig 4 barrier layer 36.

The rationale why claims 9,20 are obvious over Lou has been discussed in the rejection of claims 3-6,14-17.

8. Claims 11,22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lou (U.S. patent 6,468,858) in view of Lueschner (US patent 6,704,220).

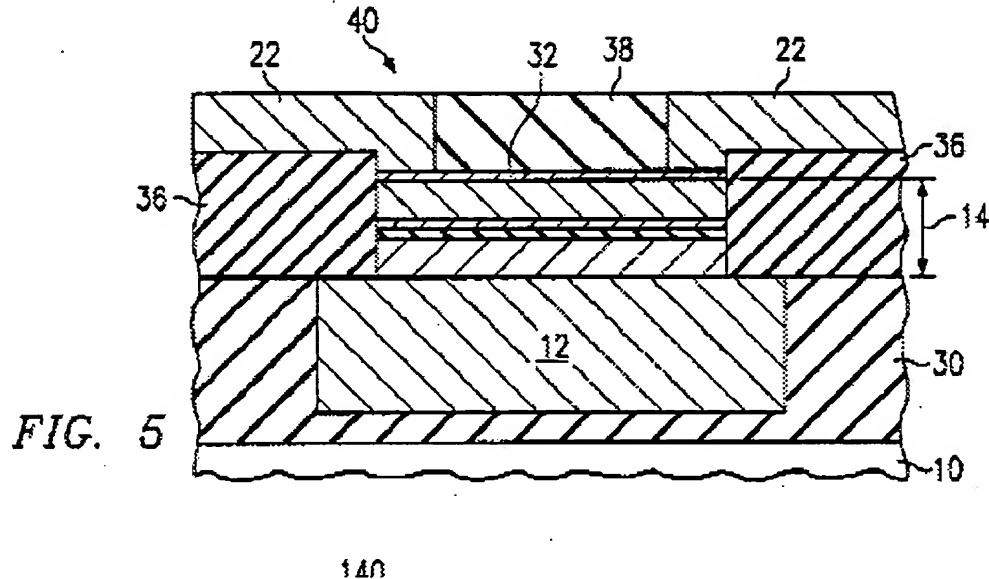
#### REGARDING CLAIM 11,22

Lou discloses all the invention except for the use of a metal etches stopper layer. Luescher, however, discloses (fig 5 layer 32) the use of a metal etches stopper layer (column 6 line 30-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings by Lou and Luescher and come up with the invention of claims 11,22.

The rationale is as the following:

A person skilled in the art at the time the invention was made would have been motivated to provide more protection for Lou device using the teachings by Luescher.



9. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and the page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.
10. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to be abandoned (see M.P.E.P. 710.02(b)).
11. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) which papers have been placed of record in the file.

#### CONCLUSION

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose telephone number is 571-272-1790. The examiner can normally be reached on Monday-Friday 9:00am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached at 571-272-1787.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval [ PAIR ] system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thinh T. Nguyen

*TTN*

Art Unit 2818

  
David Nelms  
Supervisory Patent Examiner  
Technology Center 2800